

What is Claimed is:

- [c1] A method of selecting a restoration path in a mesh telecommunication network comprising the steps of:
- sending a first message along a service path to the destination node;
 - receiving a second message from the destination node containing an array representing a restoration link capacity needed on each link over possible failures of the service path, wherein link information used to compute the array is distributed among a plurality of nodes in the network along a path of the second message;
 - using the array to select a restoration path through the network to the destination node; and
 - reserving resources for the restoration path in the network.
- [c2] The invention of claim 1 wherein the link information distributed among the plurality of nodes comprises a matrix representing a restoration link capacity needed on a link when a possible failure occurs.
- [c3] The invention of claim 2 wherein the restoration link capacity on a link may be shared by non-simultaneous failures.
- [c4] The invention of claim 3 further comprising the step of sending a third message to update the link information distributed among the plurality of nodes.
- [c5] The invention of claim 4 wherein the resources for the restoration path are reserved by sending a fourth message along the restoration path to the destination node in the network.
- [c6] The invention of claim 5 wherein the service path is setup by nodes along the service path in the network as the first message traverses each of the nodes along the service path.
- [c7] The invention of claim 6 wherein the nodes in the network are cross-connects.
- [c8] The invention of claim 7 wherein the nodes in the network are optical cross-

connects.

- [c9] The invention of claim 8 wherein possible failures are defined by shared risk link groups.
- [c10] The invention of claim 9 wherein rows of the matrix representing restoration link capacity are stored in master nodes of shared risk link groups.
- [c11] The invention of claim 10 wherein columns of the matrix representing restoration link capacity are stored in master nodes of links in the network.
- [c12] A method of selecting a restoration path in a mesh telecommunication network comprising the steps of:
- deleting links in a graph of the network which are not physically diverse from a service path;
 - computing a weight for each remaining link in the graph using an array representing a restoration link capacity needed on each link over possible failures of the service path; and
 - selecting a restoration path that minimizes the weights for each link in the restoration path.
- [c13] The invention of claim 12 wherein the restoration link capacity on a link may be shared by non-simultaneous failures.
- [c14] The invention of claim 13 wherein the nodes in the network are cross-connects.
- [c15] The invention of claim 14 wherein the nodes in the network are optical cross-connects.
- [c16] The invention of claim 15 wherein links are not physically diverse from the service path if they belong to a shared risk link group.
- [c17] The invention of claim 15 wherein links are not physically diverse from the service path if they belong to a same fiber span.
- [c18] The invention of claim 12 wherein link information used to compute the array is centralized in the network.

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[c19] The invention of claim 12 wherein link information used to compute the array is distributed among a plurality of nodes in the network.

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